Undergraduate Information Systems Programs: Time for a Change

by Vivek Shah, Roy Martain, and Mayur Mehta

Peer reviewed

Vivek Shah vs01@txstate.edu , Roy Martin rm05@txstate.edu , and Mayur Mehta mm07@txstate.edu are Professors in the Department of Computer Information Systems and Quantitative Methods, McCoy College of Business, Texas State University—San Marcos

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ABSTRACT

Amid concerns over the outsourcing of programming jobs and the end of the dot-com boom, the number of students majoring in Information Systems (IS) has declined over the last three years. In this paper, we report the results of a survey regarding trends in IS program enrollment and explore what IS departments may do in the future to increase enrollment.

Introduction

"Every major industry was once a growth industry. But some that are riding a wave of growth enthusiasm are very much in the shadow of decline" (Levitt, 1960). Departments of Information Systems (IS) or Computer Information Systems (CIS) or Management Information Systems (MIS) were "riding a wave of growth" in terms of the number of students enrolled in their programs. However, in the last few years IS programs throughout the United States have experienced a dramatic change and now face a new challenge. Compared to standing-room-only in the past, classrooms seem empty now.

There has been a sharp decline in young people selecting a computing field for their careers (Klawe 2005; Patterson 2005). The drop in enrollment has been blamed on various factors: belief in job loss; media portrayals of computing as stodgy and nerdy compared to other fields; extraordinary proficiency in math required; and misinformed high school counselors. However, except for the first, these factors also existed during enrollment boom years (Denning and McGettrick, 2005). The downturn in the economy, dot-com bust, and outsourcing of computing jobs may be causing prospective undergraduates to think twice about majoring in Information Systems. This enrollment drop has many corporations worried about finding qualified Information Technology (IT) professionals in coming years when the demand for computing professionals is expected to peak (Hoffman, 2006).

IS programs cannot afford to discharge their tasks at their own pace. IS programs are likely to lose students to other majors or departments if they continue with a "business as usual" attitude. The choice of particular segments to serve requires IS academic programs to thoroughly understand their potential students.

The objective of this paper is to present an analysis of the status of IS enrollment, determine trends of future enrollment, and explore what departments can do over the next five years to increase enrollment. It is anticipated that the analysis will provide information regarding the future direction of IS programs and aid in planning, curriculum choices, program development, and enrollment management. In effect, it is anticipated that the analysis leads to the answers for several questions, including what is the current status of IS programs in the light of declining enrollments? Should IS academic departments be concerned with their continued existence? Should these departments observe status-quo in the hope that current downward trend in enrollment reverses in the near future, or

should they aggressively pursue new programs to attract new students and bring enrollment back to the peak levels experienced?

Background Information

Levitt states, “Industries that assume themselves to be riding some automatic growth escalator invariably descend into stagnation. The history of every dead and dying ‘growth’ industry shows a self-deceiving cycle of bountiful expansion and undetected decay.” Dying industries were myopic, or short-sighted, and lacked a long-run perspective, especially where marketing was concerned. Today are Levitt’s comments equally applicable to IS departments in colleges of business? Does this mean IS programs need “glasses” to overcome a myopic vision?

Levitt's reference to businesses' lack of farsightedness as myopia seems to fit well. For example, the American railroad industry, the driver of U.S. growth in the late 1800s, was effectively bankrupt by the 1950s. The U.S. film industry--the prevailing form of popular entertainment through the first four decades of the 20th century--ran into similar hard times. Both the railroad and motion picture industries had new competitor--the automobile in the case of railroads; television in the case of the film industry. These industries assumed that growth would continue for many years and did not look far enough ahead to envision potential changes that might occur. These businesses also took a very narrow perspective as to the actual content and direction of their industry. It would be great if the good times would last forever. But the one thing we can be assured of is continuing change.

The problem worsened when both industries dismissed their new competitors. The core problem was a failure to understand the “business” that these industries were in from their customers’ point of view--transportation in the case of railroads, and entertainment in the case of movie studios. Today, many IS departments are in a similar predicament and are grappling with Levitt’s question.

In the last four to five years, IS programs throughout the United States have seen a decline in their undergraduate enrollment varying from 15 to 70 percent. In the State of Texas, from Fall 2000 to Fall 2005, the number of undergraduate IS majors declined from 11,039 students to 3,872 students or 64.9 percent (http://www.thecb.state.tx.us). In some cases, this decline has been further aggravated with enrollment caps at the college level due to AACSB requirements or inadequate funding for hiring new faculty in the colleges of business. Many colleges whose strategic objective had been growth are now changing to a quality focus. Determining and administering admission standards in a college of business is new in many places. Instead of providing for all the students who want to come, now the objective is to attract the best prepared students possible for a limited number of available seats (Burton, 2005).

Meanwhile, the IT job market is no longer in decline (Prabhakar, etc., 2005). The U. S. Bureau of Labor Statistics forecasts job growth in all computing specialties of 20 percent-50 percent by 2012, except for computer operators (decline) and programmers (flat). Finding people to fill the growing number of IT jobs will soon be more difficult than ever (Denning and McGettrick, 2005). Also, the U. S. Department of Labor shows that the number of computing-related jobs has surpassed the previous peak reached in 2000. In addition, computing-related jobs are no longer an isolated component of American Industries. Today IT underpins every function of the business community: market research, product design, finance, strategic planning--every aspect of doing and leading. These jobs require students who have a strong technical knowledge, but who can also work and contribute in a much broader realm (Klawe, 2005).

Today's undergraduate students (business or non-business) need to have good people skills in addition to technical skills to meet the requirements of a knowledge-based economy (Litecky, etc., 2004). Traditionally, CIS/IS/MIS programs have put more emphasis on programming (technical skills) than people skills. While nearly all IS programs require at least two programming courses, most also have programming components in other courses for their majors. This technical orientation limits options for non IS majors and has lead to poor interdisciplinary relationships with other disciplines. Instead of depending upon the IS department to fulfill their need, other disciplines are developing and teaching similar or the same courses as their own.

Over the last two decades, businesses have been affected by two major trends: globalization and rapid advances in technologies. In the Internet-enabled economy, we have seen the emergence of new types of markets, reorganization of business processes, global competition, and an increased emphasis on business intelligence to support decision making. With the breadth of technology skills required by students ever growing, pressure has increased on IS programs to keep pace with the new demands.

IS professionals are expected to have policy making, management and people skills to work in a multitude of environments. On the other hand, non-IS professionals are increasingly expected to have technology related knowledge (Desplaces, etc., 2003 and von Dran, 2004). The future will likely bring an even greater breadth of complex information and communication technologies. Consequently, continuous adjustments are necessary in IS programs to meet the challenge of these changing demands. This necessitates a significantly different mind set for managing both curriculum and enrollment. These new demands on IS programs was the motivation for this study.

Methodology

In order to reach a large geographic area to ascertain the current status of IS programs, a mail survey was selected for data gathering. A list of colleges/schools having IS programs was compiled using the Association to Advance Collegiate Schools of Business (AACSB) International and the Association for Information Systems (AIS) Web sites. A total of 327 Universities and Colleges were identified as having an undergraduate IS program. The name and address of the department chair or IS program coordinator was obtained by visiting the website of each college/university identified. A questionnaire was mailed to that individual. The study, conducted in the Spring of 2005, had a return of 92 questionnaires, yielding a 28.1 percent response rate. (The questionnaire used is shown in the Appendix.)

The focus of the survey was on the program content and it did not differentiate as to CIS, IS or MIS orientation. Some departments were stand alone while others were part of other departments such as accounting or management. It was expected most of the respondents would be in a business college that grants a BBA degree.

The questionnaire consisted of six parts: background information concerning the university/college and the IS department; enrollment trends in the IS department; information regarding different options for the program within the IS department; anticipated future topic coverage; status of IS programs within the college of business; and comments regarding strategies these departments were pursuing to increase enrollment.

Results of the Study

The first part of the questionnaire consisted of background information regarding the respondent's institution, enrollment, and whether or not they have an advisory board for the IS program. Table-1 (below) presents a profile for colleges/universities by type of degree and institution.

Table–1 Respondents Profile						
Type of University (n = 92)						
	Number of Respondents	Percent			Number of Respondents	Percent
University with Doctoral Program	26	28.3%		Public	73	79.4%
University with Masters Program	63	68.5%		Private	19	20.6%
Baccalaureate Only College/University	3	3.2%				

The total enrollment at the universities/colleges that responded ranged from 2,400 to 50,000 students, with an average enrollment of 15,441. In addition, enrollment in colleges of business ranged from 300 to 9,000 with an average of 2,190 students. The enrollment in the IS/CIS programs ranged from 6 to 550 students with 158 students being the average size of an IS program.

Of those responding, 93.4 percent (n = 86) of the institution's colleges/schools of business had AACSB accreditation. The objective of AACSB accreditation is to ensure a standard of quality that is expected in today's increasingly competitive marketplace. Students attending an AACSB accredited college are assured of receiving excellence in teaching by highly qualified faculty and relevance in course curricula through the sharing and dissemination of current business knowledge. This results in an exceptional learning experience (Bouverat).

Usually the main objective of an industry advisory board is to provide direction on curriculum development along with general business advice. An advisory board was in place at 58.4 percent (n = 52) of the IS programs. The institutions that indicated the existence of an advisory board had a board membership ranging from a minimum of four to a maximum of 100, with 15 being the average size. More than half of the IS programs utilize their advisory board for guidance in curriculum development.

A second part of the questionnaire pertained to ascertaining enrollment trends. Of all responding institutions, 4.3 percent (n = 4) indicated that their IS program enrollment had remained the same, 4.3 percent (n = 4) indicated that their program enrollment had increased, and 91.4 percent (n = 84) indicated their

enrollment had declined. Two out of four institutions that indicated their enrollment had increased were new programs.

The next question asked respondents had as its objective gathering data on the size of the decline within the last three years for those programs with an enrollment downturn (n = 84). Table-2 (below) presents enrollment declines in percentage at responding institutions.

Table-2
Percentage Decline in Undergraduate Enrollment over last three years (n = 84)

	Number of Respondents	Percentage
Less than 5%	1	1.2%
5%-10%	4	4.8%
10%-15%	7	8.3%
15%-20%	11	13.1%
20%-25%	8	9.5%
25%-33%	6	7.1%
33%-40%	8	9.5%
40%-50%	20	23.8%
More than 50%	19	22.7%

From the Table-2, it can be observed that more than 46 percent of the programs have lost more than 40 percent of their students while 23 percent of the programs have seen a decline in excess of 50 percent over the last three years. Only 6 percent of the responding institutions have seen enrollment decline by less than 10 percent. The average decline in enrollment of IS majors is approximately 35.1 percent over last three years.

Enrollment data were also analyzed to ascertain declining trends by institution type, accreditation status, funding source and presence of an advisory board. Table-3 (below) presents approximate average decline in enrollment over last three years by characteristics of these institutions.

Table-3 Approximate Percentage Decline in Undergraduate Enrollment by Type of Institutions							
Degree	Percentage Enrollment Decline	Funding	Percentage Enrollment Decline	AACSB Accreditation	Percentage Enrollment Decline	Advisory Board	Percentage Enrollment Decline
Doctorate (n = 23)	33.9%	Public (n = 65)	32.6%	Yes (n = 81)	33.8%	Yes (n = 48)	33.2%
Masters (n =58)	33.3%	Private (n = 19)	36.7%	No (n = 3)	23.3%	No (n = 36)	33.7%
Baccalaureate (n =3)	33.0%						

From Table-3 it can be seen that the decline in enrollment has not been affected by the type of institutions. Institutions which are not AACSB accredited have less decline in percentage enrollment than their counterparts; however sample size (n = 3) is not large enough to draw any meaningful inference. Overall, the current enrollment situation is a warning sign for IS programs.

The next question dealt with the perceptions of department chairs regarding enrollment over the next five years. (See Table-4 below.) This question can help provide an insight into faculty recruiting and the strategy for acquiring future resources.

Table–4 Future Enrollment Trend (n = 83)		
	Number of Respondents	Percentage
Remains Same	34	41.0%
Decline More	9	10.8%
Increase back to the original level 3 years ago	23	27.7%
Increase more than the original level 3 years ago	1	1.2%
Increase, but not to the original level of 3 years ago	16	19.3%

From Table–4 it can be observed that 41 percent (n = 34) of the institutions are expecting no enrollment growth over next five years. Almost half of the institutions (n = 40) are expecting growth in the enrollment, while 29 percent (n = 24) of the institutions are expecting enrollment increases to or more than the original level, and only 10.8 percent (n = 9) are expecting more enrollment decline.

Since more than half of the institutions expect enrollment to remain the same or decline further, increasing IS enrollment will require a conscious and serious effort. The purpose of the next four questions was to determine what strategies IS programs are implementing to meet the challenge of the new economy and operating environment. Also considered was whether or not IS programs currently offer or are planning to offer different tracks within IS programs, certificate programs, a minor in IS for non IS majors and/or more required courses for non IS majors within or outside the college of business.

Track Programs

Track options are offered in 32.6 percent (n = 29) of the Information Systems programs, while 15.9 percent (n = 10) out of 63 do not offer tracks, but are planning to do so over next five years. The number of courses included in tracks range from two to 12, with seven being the average number of courses for a track requirement. The most frequently required number courses to complete the track program is five, which is the number required by eight of those responding. (See Table-5 below.)

Table–5
Information Regarding Track Programs (n = 29)

Different Number of tracks offered by Institutions	Number of Respondents	Percentage		Name of Tracks	Number of Respondents	Percentage
1	2	6.9%		Programming/Application Development	13	48.1%
2	17	58.6%		IS/MIS	13	48.1%
3	4	13.8%		Networking	7	25.9%
4	4	13.8%		System Analysis	6	22.2%
5	2	6.9%		E-Commerce	4	14.8%
				IT Management	4	14.8%
				End-User	4	14.8%
				Supply Chain/Operations Management	4	14.8%

From the Table-5 it can be seen that institutions that offer track options have anywhere from one to five tracks. However, approximately 58 percent of the responding institutions have a two track model. In addition, Programming/Application development and IS/MIS are the most popular tracks followed by Networking and System Analysis. Not shown in Table-5, but mentioned were Geographic Information Systems/Spatial Systems, Data Mining,

IT Marketing, Security, Project Management, Database, Data Management, and Business Technologies.

IS Minor and Certificate Programs

Nearly 62 percent (n = 55) of the responding institutions offer a minor in IS for other business and/or non-business majors. The number of courses included in a minor range from two to 20, with six being the average requirement. Six courses were also mentioned most frequently for a minor requirement by 18 institutions. Of those that do not offer a minor, 24.3 percent (n = 9) are planning to do so in the next five years. The remaining 73.0 percent (n = 28) have no plans for a minor.

Compared to the large number of institutions offering a minor, only 17.9 percent (n =16) have a certificate program. The number of courses included in certificate programs range from two to 16, with six being the average requirement. Of those with no certificate program, only 5.2 percent (n = 4) are planning to offer one in the next five years. 94.7 percent (n = 72) have no plans to offer a certificate program.

Only 13 (14.1 percent) of the institutions offer both minor and certificate programs, and only one institution which does not currently offer either program is planning to offer both over next five years.

Interdisciplinary Programs

Table-6 (below) presents data concerning Interdisciplinary programs. Of those responding 17.4 percent (n = 16) offer an interdisciplinary program in Information Systems with other departments on campus. Most of the responding institutions (n = 13) offer only one interdisciplinary program.

Table–6
Information Regarding Interdisciplinary Programs (n = 16)

Different Number of interdisciplinary programs offered by Institutions	Number of Respondents	Percentage	Name of Interdisciplinary Program	Number of Respondents	Percentage
1	13	81.2%	Computer Science	5	31.2%
2	2	12.5%	Engineering	3	18.8%
3	1	6.3%	Art	2	12.5%
			Health Management	2	12.5%
			Spatial Information	2	12.5%

			Systems/Geography		

An interdisciplinary program with Computer Science (n = 5) is the most popular followed by programs with Engineering. Interdisciplinary IS programs are also offered in Mathematics, E-Commerce, Law and Accounting. Only 6.8 percent (n = 5) of 76 of the institutions that do not have an interdisciplinary program are planning to add one over the next five years.

IS Courses for Non-IS Majors

The next two questions were to determine whether or not IS departments are offering required courses for other business and non-business majors. See Table-7 below.

Table–7
Information Regarding IS Courses for Non-IS Majors (n = 40)

Number of Required Courses Offered for Other Business Majors	Number of Respondents	Percentage	Name of Major for Which Required Course is Offered	Number of Respondents	Percentage
1	29	72.5%	Accounting	36	90.0%
2	9	22.5%	Management	23	57.7%
3	1	2.5%	Finance	23	57.5%
4	1	2.5%	Marketing	23	57.5%

Of all respondents, 41.6 percent (n = 40) offer IS courses for other business majors in addition to the required core IS course. Only 7.7 percent (n = 4) of the institutions that do not offer a required IS course for other business majors are expecting to do so within the next five years. The number of required courses for other business majors range from one to 4, with only one course being offered by 72.5 percent (n = 29) of those responding. Required IS courses for accounting majors was noted most often along with management, finance, and marketing.

IS courses for non-business majors were offered by 18.5 percent (n =17) of the institutions, and 9.3 percent (n =7) of 75 institutions which do not currently offer a required IS course for non-business majors are planning to do so over the next five years.

Programming Languages

Table–8 (below) presents data concerning the current and future use of programming languages in IS programs.

Table-8 Information Regarding Programming Languages (n = 92)				
	Currently Taught		To be taught in the Future	
Programming Languages	Number of Respondents	Percentage	Number of Respondents	Percentage
C++	33	35.9%	17	18.4%
C#	10	10.9%	21	22.8%
COBOL	27	29.3%	12	13.0%
JAVA	64	69.6%	41	44.6%
HTML	41	44.6%	32	34.8%
VB/VB.NET	75	81.5%	58	63.0%
Other (SAS, ASP, XML, etc.,)	9	9.8%	7	7.6%

From the Table-8 it can be observed that currently VB.NET is the primary language used in undergraduate programs. This is followed by JAVA, HTML, C++ and COBOL. Within the next five years, VB.NET and JAVA are expected to remain the dominant languages in IS curriculum. However, while COBOL will not die, it is expected to be taught by less than 13 percent of the institutions. Many respondents indicated that they do not know what computer languages they will be offering after five years. This is a dilemma for IS programs when the long amount of time required for curriculum changes to be made and the constant need for faculty development are considered. Two trends seem to emerge: most IS programs will include an emphasis on more than one computer language and frequent changes in the computer languages will be necessary.

A third part of the questionnaire was related to the coverage of topics within the IS curriculum. Today's IS programs are facing the dilemma of determining the level of technical skills to balance with people and managerial skills for both IS and non-IS majors. Currently there is a paradigm shift in the type of technology used to deliver IS by the IT industry (Sutcliffe, etc., 2005). Therefore, those surveyed were asked which topics they plan to cover extensively five years from now to determine if there will be a shift in the emphasis on particular IS topics as the businesses world changes. See Table-9 below.

Table –9 Future Directions of IS programs (n = 91)		
Topic	Number of Respondents	Percentage
Technical	32	36.0%
Application Development	38	41.8%
Managerial	53	51.2%
Global	55	60.4%
Web/Internet Application Development	73	79.4%
Networking/Security	75	82.4%
Database	50	55.0%

As shown in Table–9, there appears to be a shift in topical coverage to more Network/Security and Web/Internet Application Development topics. It is suspected that the less emphasis on Technical and Application Development topics could be attributed to the outsourcing of jobs, while emphasis on Networking/Security and Web Development topics could be attributed to changes occurring in the telecommunication, networking and technology industries. More than a majority who indicated an emphasis on Global and Managerial topics coverage such as project management could be attributed to the international nature of today's business. Added emphasis on non-technical topics could also be due to the demand by businesses for students with a wide variety of general business knowledge. In other words there will be shift from technical to a more managerial focus in the IS major.

Future of IS programs in the College/School of Business

The last part of the questionnaire was to address a critical organizational issue. Respondents were asked whether their IS department is currently in the College/School of Business and in future do they see the department as being eliminated as a separate department and becoming integrated with other functional departments. Eighty-five out of the ninety respondents indicated that currently their department is in the College/School of Business. Only five respondents indicated that their departments are a part of Computer Science, Engineering or the Arts and Science College. Of the respondents 27.1 percent (n = 23) indicated that the IS department will cease to exist as a separate department in the next five years and merge with other functional areas. Similarly, 14.1 percent (n =12) of the respondents indicated that the IS department will cease to exist as a separate department in the next ten years. In other words, approximately 60 percent (n = 50) indicated that IS will remain as a separate department.

Strategies to Increase IS Department Enrollment

Data presented in Table-2 (above) indicate that the number of college students majoring in IS has declined in recent years. Does this enrollment decline mean students are less interested in IS programs and technology as well as a career in the information systems? Perhaps a change in IS curriculum is needed to attract new students to IS departments.

While career preparation is not the sole purpose of a university education, it is a critical component. Martin, etc. (2005, page XVIII) stated that "Today's graduates should be prepared to leverage IT tools to enhance their own productivity in the workplace and their career advancement, as well as for the good of an enterprise." Companies need a hands-on presence to manage projects and provide technical services that cannot be done from the other side of the globe. It's now more important than ever for graduating students to have business skills. Organizations are more aware than ever about what IT can do for them (Lai, 2006). Thus, future graduates need to learn how to address and solve critical IT problems by using management tools and solutions in a global situation for any industry.

To increase IS enrollments and meet the demands of a global workforce, it is imperative that IS programs should open up their curriculum to other majors; both business and non-business. In light of the current situation in the IT industry and IS departments as well as department chair responses to open ended questions from the survey, the following strategies are suggested to increase undergraduate IS enrollment.

- Make the first computing course exciting. There is a need to convert students who enjoy "computer literacy" into majors. Most IS programs offer a computer productivity tools course for business and non-business majors. Such a course typically exposes students to the Microsoft Office environment and in some cases Web page creation. This course should be used to get students excited about IS by including projects that demonstrate the fundamentals of building web-based systems that integrate these productivity tools for decision support or business intelligence. Access to systems by iPods and mobile phones and the use of features such as flash, music and animation would get students energized about computing. The idea is to include technology that students are accustomed to now and are likely to interact with in the future.

- The work environments in which business and non-business majors are entering has never been more challenging and dynamic. The focus and nature of IT employment will change from blue-collar, technical based-skills to more white-collar management and design centric

positions (Orlov, etc, 2006). Curriculum revisions such as the following should be considered for IS majors:

- Address a stronger management of IT content; shift from programming and technical aspects to dealing with the management of IT.

- Introduce analysis, management and operational issues into existing courses that already have a strong technical content.

- A background in technology is a skill set that is required of all graduates regardless of major for employment in many industries today, and will become increasingly important in the future (USA Today, 2005). Thus, IS programs should build connections to other disciplines by:

  - developing an integrated business curriculum based upon the Enterprise Resource Planning (ERP) model that focuses on ways IT can integrate various business functional areas for both traditional brick-and-mortar and Internet business models;

  - developing curriculum with the Department of Accounting to focus on Information Security and Assurance. This is one of the fastest growing job markets in the United States (USA Today, 2005);

  - revising curriculum to offer an *IS MINOR* to other university students and develop interdisciplinary programs such as a BS in Bioinformatics or BA in Graphics Design; and

  - aligning IS programs with other already existing programs on campus.

- Develop partnerships with industry to promote more internships and co-op opportunities.

- Work with an Advisory Council, employers and prospective employers to ensure IS programs adapt to changing industry needs. An advisory Council can increase communication between and foster closer ties with the business community so that the IS department can better serve the IS requirements of business and industry.

- Develop partnerships with community colleges to direct interested students to IS programs and promote IT as a career to high school students as early as their sophomore year.

Currently, most IS programs have too many prerequisites and too many required courses. An IS program needs to be flexible enough to satisfy the needs of different types of students. One possibility could be reducing the number of required courses to no more than four: two programming courses, and one each in system analysis and databases. This will open up the IS curriculum and allow IS students to fill out their major with electives they would like to pursue to develop specialized skills. Further, IS programs should carefully examine prerequisites for their courses. Many times prerequisites were in place to prevent non-IS students from taking IS classes. Since classrooms are empty now, we should reach out to other majors. This will streamline the curriculum and provide opportunities for non-IS students to take classes in the IS department.

Conclusions

The rapid changes in Information Systems has led to paradigm shift in the IS profession. The future of the U. S. information technology industry--and thus the competitiveness of the nation--is caught in a trap of misconception (Klawe, 2005). The pervasiveness and the critical importance of IS in a global business environment suggests a vastly expanded role for IS academic departments. Driven by a decreasing number of students planning to major in IS, senior administration at universities emphasizing the strategic value of programs, and the need to integrate information technology into other non-IS programs, IS academic departments are facing an environment in which the traditional rules no longer apply.

The reality is that a career in IT is dynamic and entry level jobs are back in demand. The total number of entry level IT positions has increased almost 50 percent since April 2002 (Prabhakar, etc., 2005). Yet, the myth of a narrow, boring and uncertain work life persists. It seems clear that IS academic programs and courses need to be updated and upgraded to meet the challenges and changes in the global environment. They must take the initiative to introduce, at a more rapid pace than before, new programs, tracks and courses. IS programs need to add innovation themes to curriculum that would be attractive to prospective students. It will take time to see the effects of many of these changes, so we have to make a long-term commitment. However, if IS academic departments do not change with the times, then other departments on campuses may begin teaching more IS related courses, and/or students will go elsewhere. IS academic departments could become extinct and may become another service area which provides courses to college of business students similar to the current status of former business statistics (management science) departments.

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Appendix

Questionnaire

1. What is the highest academic degree offered by your College of Business?

   _____ Doctorate _____ Masters _____ Bachelors

2. Your institution is: _____ Public _____ Private

3. Is your College of Business AACSB credited? _____ Yes _____ No

4. Approximate enrollment of University: _____

5. Approximate enrollment of College/School of Business: _____

6. Approximate enrollment of IS/CIS majors: _____

7. Do you have an Industry Advisory Board for the IS/CIS Department? _____ Yes _____ No

   If yes, approximately how many members do you have? _____

8. The number of IS majors in your program over the last three years has

   _____ Remained same _____ Declined _____ Increased

   If the number of IS/CIS majors has either increased or decreased, please indicate approximate percentage of increase/decrease.

   _____ < 5% _____ 5% - 10% _____ 10% - 15%
   _____ 15% - 20% _____ 20% - 25% _____ 25% - 33%
   _____ 33% - 40% _____ 40% - 50% _____ > 50%

   If the number of majors declined over last three years, do you think over the next five years IS majors enrollment will

   _____ Remain same
   _____ Decline more
   _____ Increase back to the original level
   _____ Increase to more than the original level

9. Which of the following ***languages*** are a part of your curriculum presently? Which do you think will be a part of your curriculum five years from now?

	Currently	Five years From now
C++	_____	_____
C#	_____	_____
COBOL	_____	_____
JAVA	_____	_____
Java Script/HTML	_____	_____

VB.Net _____ _____
Other (please specify) _____ _____

10. Do you offer different ***tracks*** within the IS program? (e. g. software development, networking, e-commerce, etc.,) _____Yes _____ No

    If yes, how many different tracks do you offer? _____

    Approximately how many courses are required to complete each track? ____

    Please specify the name of the track(s): _____ _____

    If no, are you planning to include different tracks in your IS program over next five years? _____Yes _____ No

11. Do you offer an IS ***minor*** for other business or non-business majors? _____Yes _____ No

    if yes, how many courses do students take to receive a minor? _____

    If no, are you planning to offer a minor in IS within the next five years? _____ Yes _____ No

12. Do you offer a ***Certificate*** program in IS? _____Yes _____ No

    If yes, how many courses do students take to receive a certificate? _____

    If no, are you expecting to offer a certificate program in next five years? _____Yes _____ No

13. Do you offer an ***interdisciplinary*** IS Program? (i. e. joint degree with Health Information Systems, Engineering etc.,) _____Yes _____ No

    If yes, with what discipline(s) are interdisciplinary program(s) offered? _____ _____ _____

    If no, are you expecting to offer an interdisciplinary IS Program within the next five years? _____Yes _____ No

14. Does your department offer ***required*** IS courses (beside a core course – such as MIS) for ***other business majors***? _____Yes _____ No

    If yes, how many required courses are offered for other business majors? _____

    for what disciplines? _____ Acc ____ Mgmt _____ Fin ____ Mkt

    Other (please specify): _____

If no, are you expecting to offer any required IS courses for other business majors in next five years? _____Yes _____ No

15. Most IS departments offer an **MIS course** as a **core course** which is required for all business majors. At your institution do you offer an MIS course as a core course? ____ Yes ____ No

    If no, what is the required IS core course for all the business majors currently?
    _____

    If yes, do you expect the MIS course to be required as a core course five years from now? _____ Yes _____ No

        If no, what course or topic will replace the MIS course as a core course? _____

16. Does your department offer courses that are ***required*** for ***non-business majors*** (such as Health Information Systems, .NET for computer science majors, Multi-Media Technology for Education, etc.) _____Yes _____ No

    If no, are you planning to offer required courses for non-business majors in next five years? _____Yes _____ No

17. Do you see your IS program as having **more coverage** in the following areas in next five years?

technical	_____ Yes	_____ No
application development	_____ Yes	_____ No
managerial	_____ Yes	_____ No
global	_____ Yes	_____ No
web/internet application development	_____ Yes	_____ No
networking/security	_____ Yes	_____ No
database	_____ Yes	_____ No

18. Is your IS/CIS department located in the college/school of business?
    _____Yes _____No

    If no, in what college/school is it located? _____

19. Do you think that the Department of IS/CIS will **cease** to exist as a separate department and become **integrated** with other functional departments such as statistics/operation research departments have become in most of the business colleges.

    In next five years? _____Yes _____No
    In next ten years? _____ Yes _____No

20. What **strategy**, if any, is your department considering to attract more students into the program in the light of current off-shoring and out sourcing of IT practices and jobs? If you need additional space, please continue on a separate sheet of paper.

21. Please provide additional comments or thoughts on the **future of undergraduate IS curriculum or enrollment**. If you need additional space, please continue on a separate sheet of paper.

Thank you very much for your participation.

Please return the completed questionnaire to:

Vivek Shah
Department of CIS & QMST
McCoy College of Business
Texas State University-San Marcos
San Marcos, Texas 78666

http://www.westga.edu/~bquest